Specific Modules and Specific Outcomes: an Interrupted Time Series Analysis Examining Internalizing Symptoms and MATCH Modules

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Introduction:

- Room for improvement in psychotherapy to treat youth depression and anxiety[1,2]
- Precision medicine → personalize therapy?
- Modular treatments (Modular Approach to Therapy for Children, aka MATCH)[3] developed to offer treatment that can adaptively respond to interference/poor response
- Little literature on the efficacy of each module on its own
- Further research needed on what treatment components are effective for which outcomes, build knowledge base for personalizing interventions

Aims:

- Examine the impact of specific modules on internalizing symptoms among youths who received MATCH in a randomized effectiveness trial[3]
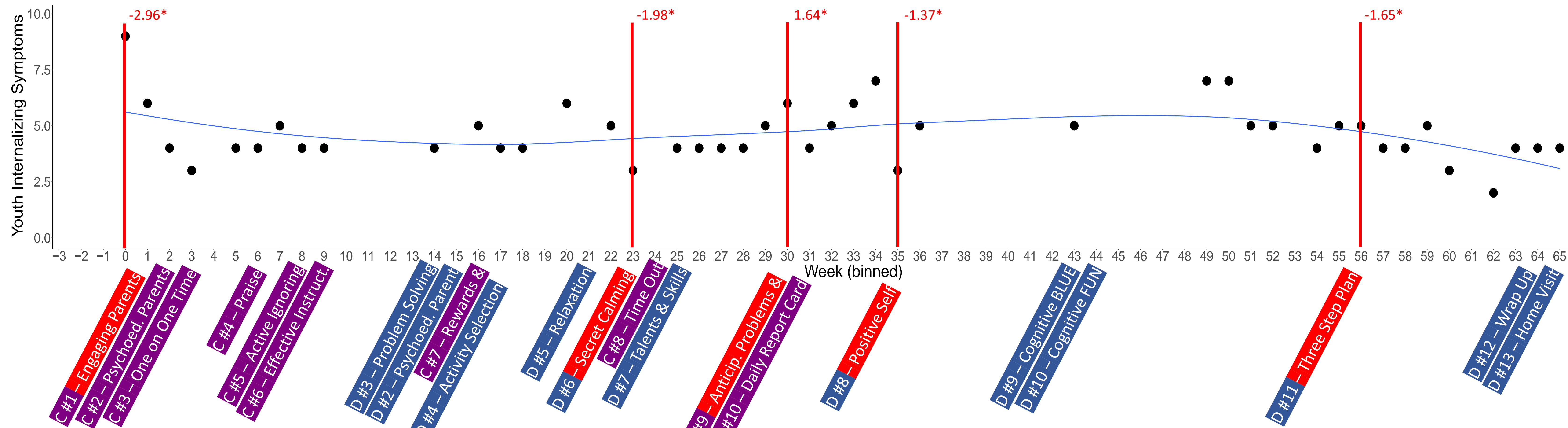
Table 1. Participant demographics and model fit

	Participant #1	Participant #2	Participant #3
Age	13	11	9
Gender	Male	Female	Male
Race	Multi-racial	Caucasian	African American
Primary Problem	Depression	Depression	Anxiety
Model AIC	180.81	120.69	184.37
Model BIC	229.31	144.34	203.08

Table 2. Parameter Estimates for Participant #1. Values estimated using maximum likelihood. Nonsignificant modules excluded from table.
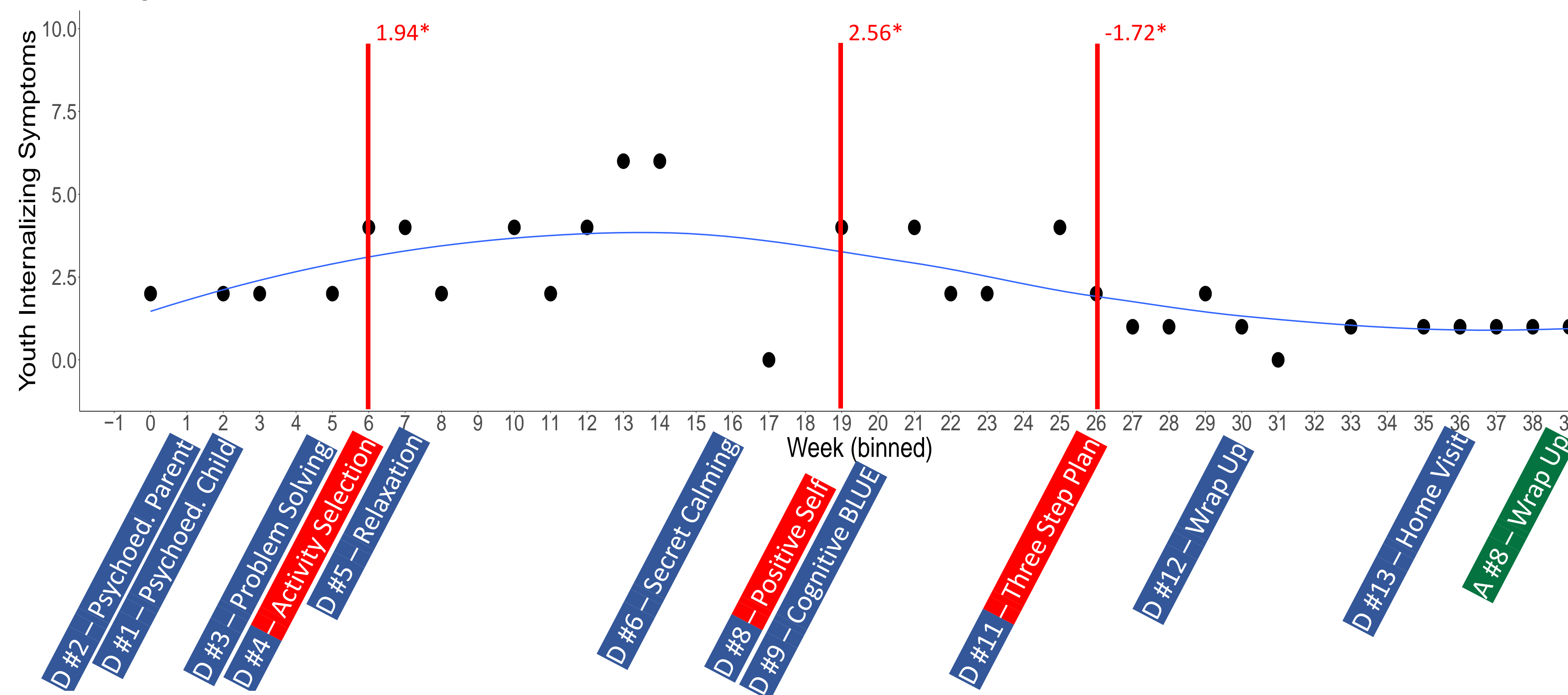
Parameter	Estimate	SE	P-value	Module Description
MU	9.02	0.87	< 0.001*	Average int. sx. Baseline
AR1,1	0.34	0.15	0.03*	Autoregressive factor
D#6 Secret Calming	-1.99	0.94	0.03*	Relaxation training
D#8 Positive Self	-1.37	0.62	0.03*	Role play positive interactions with others
D#11 Three Step Plan	-1.65	0.52	0.002*	Identify best skills, where /when child should use
C#1 Psychoed. Parents	-2.96	0.99	0.003*	Discuss treatment plan
C#9 Anticipate Problems	1.64	0.65	0.01*	Create plan for future public misbehavior

References
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3. Chorpita, B., & Weisz, J. (2009). MATCH-ADTC: Modular Approach to Therapy for Children (MATCH) with anxiety, depression, trauma, or conduct problems.
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5. Weisz, J. R., Chorpita, B. F., Palinkas, L. A., Schoenwald, S. K., Miranda, J., Bearman, S. K., ... Research Network on Youth Mental Health, and the. (2012). Testing Standard and Modular Designs for Psychotherapy Treating Depression, Anxiety, and Conduct Problems in Youth: A Randomized Effectiveness Trial. JAMA Psychiatry, 69(3), 274–282. https://doi.org/10.1001/archgenpsychiatry.2011.147
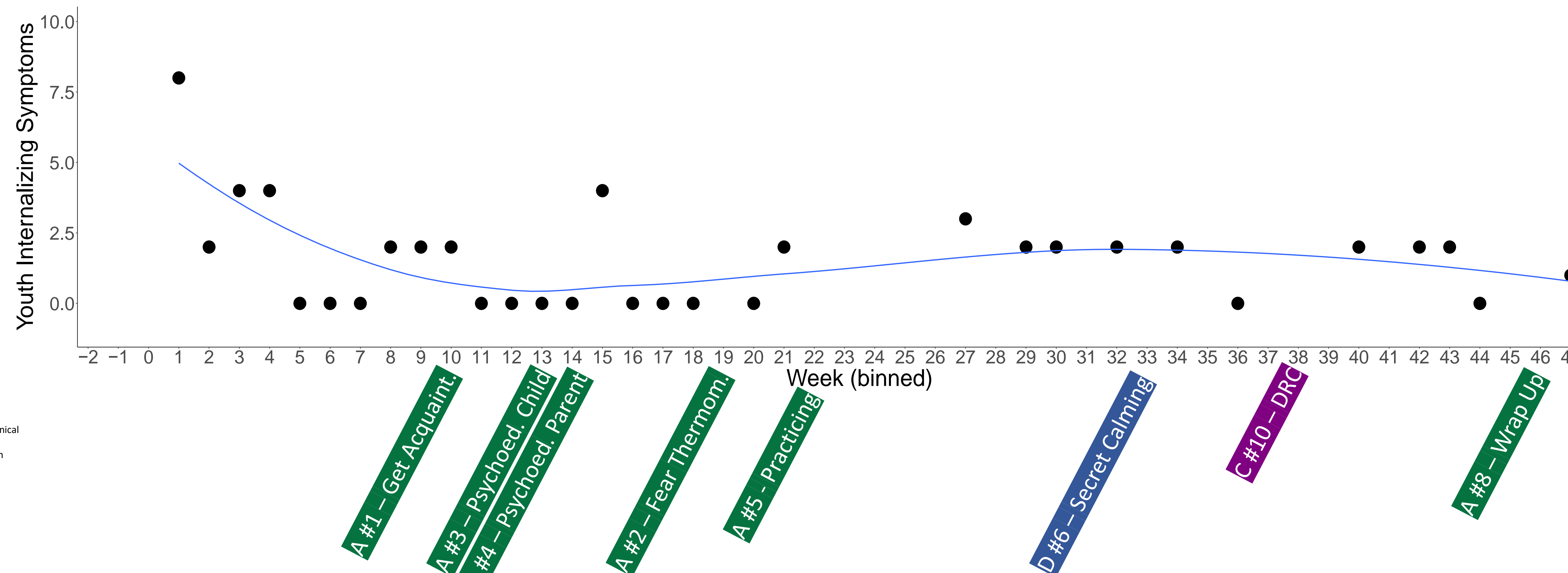6. Boswell, J. F., & Schwartzman, C. M. (2018). An Exploration of Intervention Augmentation in a Single Case. Behavior Modification, 0145445518796202. https://doi.org/10.1177/0145445518796202

Figures 1-3. Youth rated internalizing symptoms over time with a LOESS curve. Treatment started at week 0. Red box and * next to effect size indicates statistical significance p > 0.05. A = Anxiety module, C = Conduct module, D = Depression module

Participant #1

Participant #2

Participant #3

Method:

- Participants are 3 youth with depression or anxiety who received MATCH therapy.
- Inclusion criteria:
  - (1) At least 1 assessment before start of treatment
  - (2) Treatment lasted ≤ 30 weeks
  - (3) Improvement in internalizing symptoms across treatment (Reliable change index > 1.96)[4]
- Youth rated weekly symptom reports (Brief Problem Checklist)
- Weekly clinician reports of therapy sessions
- Missing data imputed using interpolation
- Effects of introduction of modules on internalizing outcomes were examined using an interrupted time series model[5]
- Modules represented with dummy coded variables (0 before, 1 after introduced)
- First order autoregressive model had best fit (determined by AIC and BIC)

Results:

- Different modules had significant effects on internalizing symptoms for different participants
- Effect size represents shift in average internalizing symptom rating from baseline that can be uniquely attributed to that module
- Future directions: expand N, consider other models
- Limitations inherent to idiographic research, necessary for expanding knowledge base to inform precision medicine